Course Code: 23EE2T01

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

I - B. Tech II-Semester Regular/Supplementary Examinations (BR23), June – 2025

ELECTRICAL CIRCUIT ANALYSIS-I (EEE)

Time: 3 hours | Max. Marks: 70

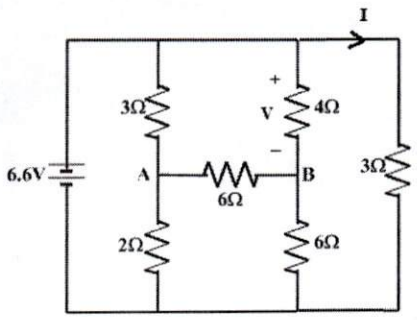
Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	Explain about different types of dependent sources.	(2M)	1	L2
b)	Explain the concept of source transformation.	(2M)	1	L2
c)	What is the purpose of the dot convention in coupled coils?	(2M)	2	L1
l)	State Faraday's first law of electromagnetic induction.	(2M)	2	L2
e)	What is the significance of operator 'j' in a.c. circuits?	(2M)	3	L1
f)	Draw the phasor diagram for pure inductor when applied across a AC supply	(2M)	3	L2
g)	Derive the resonance frequency for series RLC circuits.	(2M)	4	L4
h)	Obtain the formula for half power frequencies in series rlc circuit	(2M)	4	L2
i)	State reciprocity theorem.	(2M)	5	L1
j)	State Superposition Theorem	(2M)	5	L1

PART–B (5X10 = 50M)

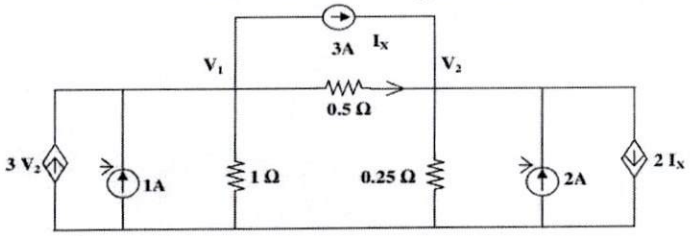
2.a) Using Mesh analysis, find V and I in the circuit below figure



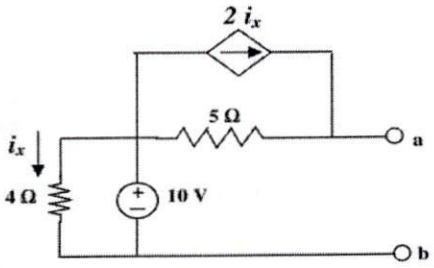
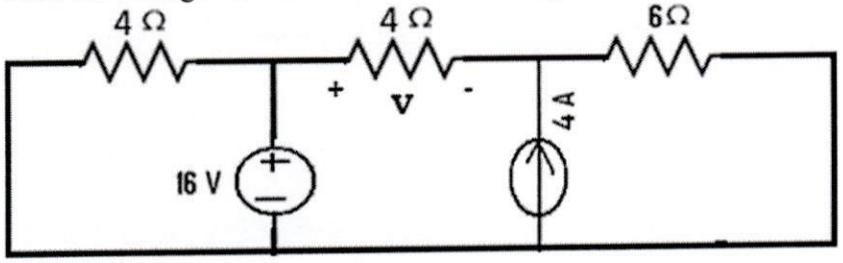
10(M) 1 L5

(OR)

3.a) For the network shown in below Figure , find the node voltages V_1 & V_2.



10(M) 1 L5

4.a)	Two coils connected in series aiding fashion have a total inductance of 100 mH. When connected in a series opposing configuration, the coils have a total inductance of 60 mH. If the inductance of one coil is double the other, find self, mutual inductances and coefficient of coupling.	10(M)	2	L5
	(OR)			
5.a)	Two coupled coils have self-inductances L_1= 10mH and L_2=20mH. The coefficient of coupling (K) being 0.75 in the air, find voltage in the second coil and the flux of first coil provided the second coil has 500 turns and the circuit current is given by i1 = 2 sin314t A.	10(M)	2	L5
6.a)	Derive the expression for the complete response for the current in a series RC circuit excited by sinusoidal supply by closing the switch at t = 0+.	10(M)	3	L3
	(OR)			
7.a)	A resistance of 10 Ω is connected in parallel with a 2 μF capacitor and the network is connected to a 120V, 60Hz supply. Determine the current and power in resistor and capacitor.	05(M)	3	L5
b	Derive the formula for Form factor and peak factor value for a pure sinusoidal waveform.	05(M)	3	L3
8.a)	Derive the expressions for current and impedance in series RLC circuit at resonance. Also Explain the significance of the Q-factor, bandwidth, and selectivity in a series resonant circuit.	10(M)	4	L3
	(OR)			
9.a)	Draw and explain the locus diagram for an RL circuit when R is constant and L is varied.	10(M)	4	L4
10.a)	Using Norton's theorem, find R_N and I_N of the circuit in figure 3 at terminals a-b. 	06(M)	5	L5
b)	State and explain Maximum Power Transfer theorem.	04(M)	5	L2
	(OR)			
11.a)	Find the voltage 'V' in the circuit below figure using Thevenin's theorem. 	10(M)	5	L5

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